

We claim:

1 *1.* An apparatus for placement in a body cavity having an inner surface in a patient,

2 said apparatus comprising:

3 an implantable, inflatable balloon for disposition into said body cavity and which

4 when inflated expands into said body cavity to prevent said inner surface of said body

5 cavity from folding in on itself and to thus allow substantially all of said inner surface to be

6 exposed to at least one point within an interior of said balloon; and

7 a subcutaneous, implantable catheter coupled to said inflatable balloon for
8 percutant disposition into said patient to access said body cavity, said catheter arranged
9 and configured to provide repetitive access to said body cavity over an extended period of
10 time, and having a first lumen to allow an optical fiber to be disposed through said first
11 lumen into said inflatable balloon while being segregated from said interior of said balloon
12 and to illuminate said inner surface to provide repetitive photodynamic therapy to tissues
13 adjacent to said inner surface, and having a second lumen for inflation of said balloon.

1 *2.* The apparatus of claim 1 further comprising a light diffusing fluid disposed in said

2 inflatable balloon.

1 *3.* The apparatus of claim 1 further comprising said optical fiber.

Sub A1
4. The apparatus of claim 3 where said optical fiber has a distal end and further
2 comprising a light diffuser disposed on said distal end of said optical fiber.

Sub A2
1 5. The apparatus of claim 1 wherein said subcutaneous catheter comprises a
2 proximal end and a self-healing membrane coupled to and closing said proximal end.

Sub A3
1 6. The apparatus of claim 1 wherein said subcutaneous catheter comprises a
2 proximal end and comprises an insert coupled to said proximal end, said insert having a
3 distal end coupled to said first lumen in said subcutaneous catheter.

Sub A4
1 7. The apparatus of claim 1 wherein said first lumen has a distal end and further
2 comprising a transparent plug disposed in said distal end of said first lumen and sealing
3 said first lumen.

Sub A5
1 8. The apparatus of claim 1 wherein said subcutaneous catheter has a second lumen
2 defined therethrough used to inflate said balloon.

Sub A6
1 9. The apparatus of claim 8 further comprising a valve for sealing said second lumen
2 to prevent deflation of said balloon.

Sub A7
1 10. The apparatus of claim 6 wherein said insert is funnel shaped, narrowing down to
2 where said insert is coupled to said lumen to ease in disposition of said insert into said

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3 patient and to facilitate introduction of said optical fiber therethrough without damage to
4 said optical fiber.

1 11. The apparatus of claim 10 where said insert snugly press fits into said lumen.

1 12. The apparatus of claim 11 where said insert is disposed into and supported only by
2 a cranium of said patient and is supported by said cranium so that forces applied to said
3 insert are prevented from being transmitted to underlying brain tissue.

1 13. The apparatus of claim 1 wherein said apparatus is entirely subcutaneously
2 implanted.

1 14. The apparatus of claim 1 wherein said apparatus is entirely subcutaneously
2 implanted in a breast.

1 15. The apparatus of claim 1 wherein said apparatus further comprises an ambulatory
2 laser and control circuit for repetitive, fractionated photodynamic treatment.

1 16. The apparatus of claim 15 wherein said apparatus further comprises a detector for
2 recording dosage levels and history applied to said patient by said ambulatory laser and
3 control circuit.

1 17. The apparatus of claim 1 further comprising a radiation source disposable in said
2 catheter for repetitive, fractionated radiation treatment in combination with fractionated
3 photodynamic treatment through said catheter.

1 18. The apparatus of claim 17 where said radiation source is a wire disposable into
2 said catheter with a distal tip having a radioactive material disposed thereon.

*Sub
A* 19. The apparatus of claim 1 further comprising a subdermally implanted remote
2 optical coupler and a permanently implanted optical fiber communicating between said
3 optical coupler and said balloon.

1 20. The apparatus of claim 19 where said subdermally implanted remote optical
2 coupler is entirely subdermally implanted.

1 21. The apparatus of claim 19 where said subdermally implanted remote optical
2 coupler further comprises a transdermal optical connector.

*Sub
A* 22. A method of photodynamically treating a tumor resection characterized by a body
cavity having an inner surface in a patient comprising:
3 selectively disposing and retaining a photosensitizing drug in cancerous tissue
4 within said inner surface of said body cavity and adjacent thereto;

5 disposing an inflatable balloon into said body cavity coupled to a subcutaneous
6 catheter;

7 inflating said inflatable balloon in said body cavity by means of a first lumen defined
8 in said subcutaneous catheter to prevent said inner surface of said body cavity from
9 folding in on itself and to thus allow substantially all of said inner surface to be exposed to
10 at least one point within said balloon;

11 disposing an optical fiber through a second lumen defined in said subcutaneous
12 catheter to position a distal end of said optical fiber within said inflatable balloon; and

13 repetitively delivering a fractionated dosage of light through said optical fiber to
14 effectively photodynamically treat said tumor resection.

23. The method of claim 22 further comprising removing said optical fiber from said
subcutaneous catheter.

24. The method of claim 23 further comprising repeating the disposition of said optical
fiber into said subcutaneous catheter and the delivering a dosage of light through said
3 optical fiber to effectively photodynamically treat said tumor resection during treatments
4 repeated over an extended period of time.

1 25. The method of claim 24 where said extended period of time comprises at least one
2 month.

1 26. The method of claim 24 where said extended period of time comprises more than
2 one year.

1 27. The method of claim 22 where inflating said inflatable balloon in said body cavity
2 through said subcutaneous catheter inflates said balloon with a light diffusing fluid.

1 28. The method of claim 22 where disposing an optical fiber through said
2 subcutaneous catheter repetitively positions said optical fiber therein over an extended
3 period of time during which said a fractionated dosage of light is repetitively delivered.

29. The method of claim 28 where said extended period of time comprises at least one
month.

30. The method of claim 28 where said extended period of time comprises more than
one year.

1 31. The method of claim 22 further comprising providing an ambulatory laser and
2 control circuit to said patient coupled to said optical fiber to repetitively deliver a
3 fractionated dosage of light through said optical fiber to effectively photodynamically treat
4 said tumor resection.

1 32. The method of claim 22 further comprising disposing a radiation source through
2 said subcutaneous catheter to position a distal end of said radiation source within said
3 inflatable balloon, and repetitively delivering a fractionated dosage of radiation from said
4 radiation source in combination with a repetitively delivered fractionated dosage of light
5 through said optical fiber to effectively photodynamically treat said tumor resection.

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33. The method of claim 22 where disposing said optical fiber through said
subcutaneous catheter comprises disposing said optical fiber through an implanted
3 remote access port.

1 34. The method of claim 33 where disposing said optical fiber through a remote access
port disposes said optical fiber to an optical coupler serving as said remote access port
and having a permanent implanted optical fiber coupling said optical coupler to a light
emission point positioned in said balloon, and where repetitively delivering a fractionated
5 dosage of light through said optical fiber comprises coupling an external optical fiber to
6 said optical coupler and delivering said fractionated dosage of light through said external
7 optical fiber to said optical coupler.

1 35. The method of claim 34 where coupling an external optical fiber to said optical
2 coupler and delivering said fractionated dosage of light through said external optical fiber
3 to said optical coupler comprises coupling said external optical fiber with said optical
4 coupler by transdermal disposition of said external optical fiber.

1 36. The method of claim 34 where coupling an external optical fiber to said optical
2 coupler and delivering said fractionated dosage of light through said external optical fiber
3 to said optical coupler comprises coupling said external optical fiber with said optical
4 coupler by coupling to an optical connector which extends transdermally from said optical
5 coupler.

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